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many biological explanations and theories will need alteration.
—J. CHRISTIAN BAY.

The phylogeny of ferns.

A late paper by J. Bretland Farmer will be found to contain suggestions of special importance to botanists interested in the phylogeny of the Filices.¹ Mr. Farmer finds that the divisions of the neck canal cell of the archegonium into two by a definite, transverse wall is by no means invariable. This has been observed by Dr. Douglas H. Campbell as an occasional occurrence in *Osmunda*, which this author has shown to be in many respects transitional between the eusporangiate and leptosporangiate Filicineae. The doubling of the nucleus in the canal cell in species of typical leptosporangiate Filicineae (Polypodiaceae) has been observed frequently. These facts suggest strongly the condition of things that obtains in the neck canal cell of the liverwort archegonium. The basal wall in the young embryo is formed as in *Isoetes* and *Equisetum*, at right angles to the long axis of the archegonium. The manner in which the young sporophyte issues from the oophyte distinguishes *Angiopteris* from those other ferns whose embryology is known. The cotyledon and stem burst through the upper surface of the prothallium, the root boring downwards through it, while in the other ferns the cotyledon and stem issue from the lower surface through the archegonial region, and grow up around the edge of the prothallium. The prothallium is very much like the thallus of *Anthoceros*, with which it is often associated.

These facts add more weight to the view that the eusporangiate ferns are the more primitive and that the ancestors of the Filices were closely connected with, if not derived from, the ancestors of such liverworts as *Anthoceros*.

It is to be regretted that Mr. Farmer's material was insufficient to make a thorough and critical study of that phase of the life history of the plant in question.—D. M. MOTTIER.

¹On the Embryogeny of *Angiopteris evecta* Hoffm.: *Annals of Botany* vi. 265 (October, 1892).